

NISTTech

Floating Vials in a Pressurizeable Container to Control Fluid Flow Rate

A simple design to deliver large numbers of fluids to microfluidic devices in a system that is efficient, stable, cost effective, portable

Description

The invention is a fluid delivery system consisting of a sealed and pressurized container containing floating storage reservoirs with different liquids for use in fabricating multiple-inlet, micro fluidic devices. The system controls the flow of liquids from as many as 19 different storage reservoirs that float in a liquid bath. As liquids are removed and the storage reservoirs empty, buoyant forces from the liquid in the container raise the height of the floating reservoirs. This compensates for the reduced height of liquid in each reservoir and results in a nearly constant flow rate as the liquids are delivered to the microchip's fluid chambers.

Applications

- - Micro fluidic flow control is needed in numerous science and biotechnology applications, such as liposome formation
- - Use in in-vitro drug delivery systems involving focused fluid streams

Advantages

- - The device facilitates the fabrication of micro fluidic devices having large numbers of fluid reservoirs that are tightly packed in a portable, sealed container
- - The system is easy to refill and/or change reservoirs
- - Different fluids can be delivered at different flow rates which remain constant as the reservoirs are drained
- - Bulky syringe pumps (or similar devices) which are prone to oscillation at low flow rates are not needed
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- No energy is required from external control devices
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- The system is compatible with micro fluidic valving systems

Abstract

A fluid delivery system is described which provides stable flow rates over a range of different flow rates and while multiple fluids are being concurrently delivered. The delivery system includes one or more reservoirs each containing a respective fluid to be transferred. The reservoir(s) are positioned within a secondary fluid selected such that the reservoir(s) and their contents, i.e. the fluids to be transferred, float within the secondary fluid. One end of a flow conduit is submerged in each fluid to be transferred. A pressure differential is then induced in the flow conduit whereby fluid flow therein occurs.

Inventors

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Citations

1. G.A. Cooksey and A.L. Plant, Controlling the flow of many fluids with floating vials in a pressurizeable container, Micro TAS 2009 Conference Abstract, 2009.

References

- U.S. Patent Application #20110180150
- Docket: 10-001

Status of Availability

This invention is available for licensing.

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